ASCE 1987 Salary Survey

By the Committee on Employment Conditions of the Professional Practice Division

Abstract: The biennial salary survey of the civil engineering profession conducted by the Committee on Employment Conditions during the fourth quarter of 1987 is presented. Results are analyzed on the basis of ASCE professional grades for consulting firms; construction firms; design/construction firms; industry, railroad or utility; state department or agency; and municipality or county, and compared to 1981–1985 survey data.

Introduction

ASCE has published periodic salary surveys since 1914, when its first-known salary survey was conducted. The Society continued to conduct surveys at varying intervals until 1950, when the survey became a scheduled biennial project. This report is the 19th ASCE Salary Survey in this biennial series. The Committee on Employment Conditions (COEC) has been charged with conducting the surveys since the committee was established in 1971, in conformance with Society bylaws to "collect, codify, and prepare for distribution such data as may be calculated to be of value to civil engineers, both employers and employees, in connection with proper classification of engineering positions and equitable compensation for services. . . ."

Salary survey questionnaires are sent to employers during the third or fourth quarter of odd-numbered years, and the data collected represent, therefore, salary and benefit conditions as of that period. This report is for the fourth quarter of 1987. Salary data were collected and analyzed based on ASCE professional grades for six employment categories. The employment categories included in this report are consulting firms; construction firms; design/construct firms; industry, railroad or utility; state department or agency; and municipality or county. Federal agencies were not surveyed since most federal salaries and benefits are standardized by the U.S. Office of Personnel Management and are a matter of public record.

The request for an average annual salary, in addition to an entrance and maximum salary for the employment categories, was added to the 1985 Salary Survey questionnaire. The inclusion of this data made possible the calculation of a middle 50% salary range and a 95% salary range for the average annual salary, replacing the "Middle Range" and "Total Range" for entrance and maximum salaries used in previous salaries. The average (mean) salary, median (middle) salary, and percent change from previous surveys are retained for the entrance and maximum rates to permit comparisons to past surveys.

Summary of Findings

This summary presents some of the more important data and its analysis, as develeoped from this survey.

Note. Discussion open until September 1, 1989. To extend the closing date one month, a written request must be filed with the ASCE Manager of Journals. The manuscript for this paper was submitted for review and possible publication on December 8, 1988. This paper is part of the ***Journal of Professional Issues in Engineering***, Vol. 115, No. 2, April, 1989. ©ASCE, ISSN 0733-9380/89/0002-0197/$1.00 + $.15 per page. Paper No. 23411.

TABLE 1. Number of Responses by Employment Category

Employment category (1)	Number of organizations (2)	Number of individuals (3)
Private employer		
Consulting firms	401	6,429
Construction firms	36	214
Design/construct firms	49	557
Industry, railroad, or utility	38	518
Subtotal	524	7,718
Public employer		
State department or agency	29	4,890
Municipality or county	94	3,456
Subtotal	123	8,346
Total	647	16,064

The 1987 Salary Survey is based on responses from 647 organizations representing 16,064 employees. A tabulation of these responses is shown in Table 1. By comparison, the 1985 survey only included consulting firms, construction firms, and design/construct firms because of a significant imbalance in the relative number of responses from the industry, railroad, or utility; state department or agency; and municipality or county categories. A comparison to the 1985 survey for these same first three categories would be 486 organizations representing 7,200 employees for 1987 versus 632 organizations representing 7,434 employees for 1985.

In the two-year period since the 1985 survey, the average combined median entrance salary for all grades increased almost 6.5% to $38,781. This statistic is computed from the average median entrance salary for each professional grade from I/II through IX and is a good trend indicator. Additional data on entrance salaries are presented in Tables 2 to 4. By categories of employment, the average median entrance salaries (and the percent increase from 1985 where data are available) are shown in Table 2. A trend analysis of the categories and median salaries over a six-year period (1983, 1985, and 1987 Salary Surveys) ("ASCE 1983" 1983; "ASCE 1985" 1985) is shown in Table 3.

Additional analyses include entrance, average annual, and maximum salaries by employment categories. The "spread" of these salaries is also shown, where the "middle 50% range" represents the average annual salary ± 0.675 standard deviations from this mean, and the "95% range" represents the average annual salary ± 2 standard deviations from this value. The 95% range may not be meaningful in certain higher-grade classifications because of possible misinterpretation of the grade description that resulted in data that skewed the results and generated a disproportionately large standard deviation for the relatively small sample population. A breakdown of combined entrance salaries, average annual salaries, and maximum salaries is in Table 15.

Starting salaries for those entering the profession in ASCE professional grades I/II for each of the employment categories are shown in Table 4. The average starting salary for the first three categories is $22,833, a 17.1%

TABLE 2. Percent Increase of Averaged Median Entrance Salaries by Employment Category for All Grades

Employment category (1)	Average median entrance salary in dollars, for 1987 (2)	Percent increase over 1985 (3)
Consulting firms	38,975	7.2
Construction firms	50,198	38.2
Design/construct firms	39,864	3.7
Industry, railroad, or utility	39,871	—
State department or agency	34,832	—
Municipality or county	37,347	—

TABLE 3. Percent Increase of Averaged Median Salaries by Employment Category between 1983 and 1987 for All Grades

Employment category (1)	Percent Increase of Averaged Median Entrance Salary Over Prior Report Period			1983–1987 total percent of increase (5)
	1983 (2)	1985 (3)	1987 (4)	
Consulting firms	6.5	8.9	7.2	16.8
Construction firms	5.3	3.2	38.2	42.6
Design/construct firms	5.3	11.4	3.7	15.5
Industry, railroad, or utility	2.5	—	—	15.7
State department or agency	4.0	—	—	24.8
Municipality or county	12.2	—	—	18.1

TABLE 4. 1987 Entrance Salaries, Grade I/II

Employment category (1)	Mean entrance salary in dollars (2)	Range of Entrance Salaries in Dollars		Median entrance salary in dollars (5)	Percent increase in median salary over 1985 (6)
		Low (3)	High (4)		
Consulting firms	21,425	12,000	39,260	21,000	5.0
Construction firms	24,414	20,000	28,000	25,000	37.4
Desigh/construct firms	22,386	15,000	30,000	22,500	10.8
Industry, railroad, or utility	25,022	18,000	33,504	24,500	—
State department or agency	23,525	18,156	28,236	23,991	—
Municipality or county	25,178	18,600	31,445	25,200	—

FIG. 1. Map of Regions Used for Comparative Purposes: (*a*) I: New England; (*b*) II: Middle Atlantic; (*c*) III: Middle West; (*d*) IV: South; (*e*) V: West; (*f*) VI: Far West

TABLE 5. Average Overall Benefit Cost as Percent of Base Payroll for Decade 1977–1987

Year					
1977 (1)	1979 (2)	1981 (3)	1983 (4)	1985 (5)	1987 (6)
34.40	36.51	38.94	34.30	32.68	33.81

TABLE 6. Average Fringe Benefit Cost as Percent of Base Payroll by Employment Category

Employment category (1)	Fringe Benefit Cost as a Percentage of Base Payroll			Change in percent (increase) 1983–1987 (5)
	1983 (2)	1985 (3)	1987 (4)	
Consulting firms	33.0	32.9	33.0	0.0
Construction firms	39.5	32.0	38.9	−0.6
Design/construct firms	28.2	29.0	31.8	+3.6
Industry, railroad, or utility	33.2	—	35.0	+1.8
State department or agency	36.5	—	31.6	−4.9
Municipality or county	22.2	—	36.2	+14.0

TABLE 7. Average Cost of Various Benefits as Percent of Base Payroll of All Employment Categories

Benefit (1)	Fringe Benefit Cost as a Percentage of Base Payroll			Increase (+) or Decrease (−)	
	1983 (2)	1985 (3)	1987 (4)	1983–1985 (5)	1985–1987 (6)
Vacation	5.17	4.67	5.06	−	+
Holidays	3.32	3.07	3.29	−	+
Sick leave	3.15	2.84	3.05	−	+
Military leave/jury duty	1.60	1.30	1.86	−	+
Incentive compensation	7.55	8.81	8.31	+	−
Retirement/deferred profit sharing	8.13	7.36	7.79	−	+
Social security/ unemployment/ workers compensation	9.59	9.46	8.96	+	−
Professional dues/ licenses/meetings	1.34	1.41	1.30	+	−
Insurance, medical	5.12	4.65	5.12	−	+
Insurance, life	1.53	1.76	1.50	+	−
Education	1.07	1.10	1.18	+	+
Separation allowance	2.40	2.92	2.75	+	−
Other	3.63	4.01	3.93	+	−

TABLE 8. Regional Relationships (Ratio of Regional to National Entrance Salary Medians for Combined Employment Categories in Each ASCE Grade)

Region (1)	Grades							
	I/II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	VIII (8)	IX (9)
New England	22,100	24,796	28,887	32,314	40,000	44,500	50,000	55,000
	0.98	0.95	0.93	0.92	1.00	1.00	0.96	0.90
Middle Atlantic	22,500	25,990	30,000	34,600	40,000	50,136	55,560	61,558
	1.00	1.00	0.97	0.99	1.00	1.12	1.07	1.01
Middle West	23,145	26,678	30,000	32,928	36,860	40,200	44,600	57,052
	1.03	1.03	0.97	0.94	0.92	0.90	0.86	0.93
South	21,500	25,100	29,110	35,000	38,500	45,000	51,000	64,940
	0.96	0.97	0.94	1.00	0.96	1.01	1.00	1.06
West	21,262	25,920	30,100	35,000	40,200	42,000	45,000	58,158
	0.95	1.00	0.97	1.06	1.01	0.94	1.10	0.95
Far West	24,930	29,000	33,450	37,000	42,000	47,920	54,000	61,116
	1.11	1.12	1.08	1.06	1.05	1.07	1.04	1.00
Foreign	25,500	26,720	36,000	40,839	47,000	56,268	63,000	63,000
	1.13	1.03	1.16	1.17	1.18	1.26	1.21	1.03
Overall median dollars	22,500	26,000	31,000	35,000	40,000	44,580	52,000	61,116

Note: Employment categories outlined elsewhere in report are combined for each grade in each region; all medians shown are expressed in annual dollars; ratio formula is overall, in dollars divided into regional median, in dollars equals quotient in decimal.

increase over those categories measured in 1985, as compared to an increase of 5.3% between 1983 and 1985.

Regional comparisons (see Fig. 1) of median salaries by professional grades are included. In the regional analysis, the average national regional median starting salary (grades I/II), irrespective of employment category, was $22,500. A breakdown of this analysis can be found in Table 8.

A survey of benefits revealed that the trend of increasing fringe benefits continued, after a decline in 1985. The overall cost of fringe benefits as a percentage of the base payroll was reported to be 33.81% for 1987, as compared to 32.68% in 1985 and 34.30% in 1983. Table 5 reviews the trend in fringe benefits for the decade. For comparison purposes, the report of benefit costs by employment categories is shown in Table 6.

General trends in fringe benefits can be seen from the overall average costs of various benefits, as reported in Table 7. The trend assessment in the right column suggests that incentive compensation, social security, professional reimbursement, life insurance, and miscellaneous allowances declined, while other benefits continued to increase.

Slightly less than 18% of organizations reported that they have an understanding with employees about their professional grade classification, and only 7% reported using the ASCE grade descriptions in their organization. Almost 35% of the organizations reported that they were familiar with ASCE's *Manual No. 55, Guide to Employment Conditions for Civil Engineers*. The latest version, the 1988 third edition, is now available through the ASCE publications fulfillment department. The cost is $5.25 for ASCE members and $7.00 for nonmembers.

General Background

Sampling Procedure

As in previous surveys, the data presented in this report were obtained from representative sources on a sampling basis. Questionnaires were mailed to 13,300 employers, based on ASCE's membership data base sorted to eliminate duplicates. A 4.8% return was achieved after elimination of unsatisfactory responses. Responses are not necessarily uniform or representative of the entire profession. Some regional responses may be statistically invalid. Overall, median salary data obtained in this manner in the past by ASCE Salary Surveys have correlated well with median salary information provided by a large sample of ASCE members responding to the Society's periodic "Survey of the Profession." The data in this survey report are solely indicators of current salary and benefits at the time the survey was conducted—and should not be considered as recommended salary and benefits levels. For ASCE guidance on a mutually satisfying relationship between the employer and the professional employee to attract and maintain highly capable people in the profession, current guidelines regarding professional employment conditions and grade descriptions, and recommendations on compensation and benefits, see ASCE's *Manual No. 55, Guide to Employment Conditions for Civil Engineers*, third edition, 1988.

Professional Grade Descriptions

ASCE's Professional Grade Descriptions were used as the basis for determining expertise or level of responsibility for comparison of salaries in

the survey, rather than years of experience. The grade descriptions have been used by ASCE for this purpose for many years. The system now in use is as jointly revised in 1975 by ASCE's COEC and the National Society of Professional Engineer's (NSPE) Professional Employment Committee. The system is compatible with NSPE classifications and correlates with federal "G.S." grades so that this survey's data can be compared to NSPE surveys and the U.S. Department of Labor's Bureau of Labor Statistics information.

Comments on Data, Analysis, and Presentation

The data contained in this survey are presented in two modes. For historical comparisons the average (mean) entrance and/or maximum salaries are used to compare data to earlier (1983) survey results (Tables 9–15) and median salaries are used for longer term (1977–1985) trend comparisons (Figs. 2–8).

For the current 1987 and prior 1985 survey data, average annual salaries were obtained, which enables a statistical determination of the distribution of the average salary within any job classification or employment category. This distribution is described in terms of the middle 50% range (mean of the average annual salary $\pm$ 0.675 standard deviations) and the 95% range (mean of the average annual salary ± 2 standard deviations). A change in this survey from the 1985 median salary for the maximum salary rates is a more pertinent "Change from 1985–1987 Mean Average as a Percentage." This calculation provides a way to relate the more meaningful average salary data to the previous salary survey.

Salary Trends

From Table 3, the downward trend of the biennial percent increases of the median salaries tends to fluctuate as the demands on the design profession and construction profession lead or lag the economy. Although the 1985 data were not analyzed for the categories of industry, railroad or utility; state department or agency; or municipality or county, based on the overall 1983–1987 percent increases it is reasonable to project the respective 1983–1985 and 1985–1987 percent increases are of the same magnitude as those shown for the other three categories (Consulting Firms, Construction Firms, and Design/Construct Firms).

The starting salaries for entrance level (grade I/II) engineers in Table 4 appear to be increasing in the same order of magnitude with the median entrance level for all grades as shown in Table 3.

Job Classification

Tables 9–15 indicate that for entry-level grades and middle-tier salaries, the determination of a standard deviation appears to present a valid statistical tool for determining the degree of skewing of the salaries within an ASCE grade classification.

An intrinsic limitation of the survey is that many employers who responded have grade classifications that differ from the ASCE professional grades, or have no formal classification system. This requires interpretation and interpolation by these employers to correlate their civil engineer employees with the ASCE grades. This has a small effect on the average salary values, but tends to significantly increase the variance and spread of the 50%

TABLE 9. Consulting Firms—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES: Average salary (3)	ENTRANCE RATES: Median salary (4)	ENTRANCE RATES: Change from 1985–1987 median as a percentage (5)	MAXIMUM RATES: Average salary (6)	MAXIMUM RATES: Median salary (7)	AVERAGE SALARY RATES: Mean average salary (8)	AVERAGE SALARY RATES: Change from 1985–1987 mean average as a percentage (9)	AVERAGE SALARY RATES: Standard deviation (10)	AVERAGE SALARY RATES: Middle 50% Range: Low (11)	AVERAGE SALARY RATES: Middle 50% Range: High (12)	AVERAGE SALARY RATES: 95% Range: Low (13)	AVERAGE SALARY RATES: 95% Range: High (14)
I/II	1,031	21,425	21,000	+5.0	27,629	26,104	24,998	+8.0	4,262	22,121	27,875	16,474	33,522
III	1,061	25,805	25,500	+6.3	32,669	32,000	29,365	+4.0	4,508	26,332	32,408	20,349	38,381
IV	911	31,191	30,500	+4.5	38,396	37,300	34,826	+4.8	5,611	31,039	38,613	23,604	46,048
V	1,105	36,466	36,000	+8.2	45,111	44,400	40,490	+5.3	6,611	36,028	44,952	27,268	53,712
VI	838	41,507	40,000	+2.4	50,979	50,000	46,563	+7.2	9,191	40,360	52,768	21,182	64,946
VII	822	47,800	46,800	+8.3	59,406	57,900	53,743	+8.0	11,886	45,720	61,766	29,971	77,515
VIII	369	52,354	52,000	+4.0	68,580	66,000	62,222	+10.7	17,739	50,248	74,196	26,744	97,700
IX	292	65,576	60,000	+15.3	81,489	79,480	76,657	+18.6	43,541	47,267	106,047	[a]	[a]
Average			38,975			49,148	40,743 Weighted average						

[a]Not meaningful

TABLE 10. Construction Firms—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES			MAXIMUM RATES		AVERAGE SALARY RATES						
		Average salary (3)	Median salary (4)	Change from 1985–1987 median as a percentage (5)	Average salary (6)	Median salary (7)	Mean average salary (8)	Change from 1985–1987 mean average as a percentage (9)	Standard deviation (10)	Middle 50% Range		95% Range[a]	
										Low (11)	High (12)	Low (13)	High (14)
I/II	32	24,414	25,000	+37.4	28,248	37,300	25,583	−9.7	2,317	24,019	27,147	20,949	30,217
III	34	28,725	30,000	+25.0	38,317	35,500	34,507	+35.9	11,355	26,842	42,172	11,797	57,217
IV	35	34,314	35,393	+30.2	40,007	45,000	39,092	+3.0	5,583	35,323	42,861	27,926	50,258
V	39	42,674	42,194	+40.6	50,587	49,800	49,007	+27.8	9,407	42,647	55,357	30,193	67,821
VI	22	51,603	54,000	+43.6	59,631	62,000	53,450	+4.3	6,186	49,274	57,626	41,078	65,822
VII	19	59,500	65,000	+37.7	67,151	70,000	63,100	+19.1[b]	12,967	54,347	71,853	37,166	89,034
VIII	15	72,000	70,000	[b]	73,714	75,000	69,878	[b]	12,633	61,351	78,405	44,612	95,144
IX	18	101,667	80,000	+14.3	131,000	105,000	83,650	+1.4	24,646	67,013	100,286	34,358	132,942
Average			50,198			59,950	51,603 Weighted average						

[a]Range may be skewed due to the small sample population
[b]Not available

TABLE 11. Design/Construct Firms—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES			MAXIMUM RATES		AVERAGE SALARY RATES						
		Average salary (3)	Median salary (4)	Change from 1985–1987 median as a percentage (5)	Average salary (6)	Median salary (7)	Mean average salary (8)	Change from 1985–1987 mean average as a percentage (9)	Standard deviation (10)	Middle 50% Range		95% Range	
										Low (11)	High (12)	Low (13)	High (14)
I/II	88	22,386	22,500	+10.8	29,918	30,432	25,504	+0.2	3,277	23,292	27,716	18,950	32,058
III	91	25,831	25,920	+8.0	36,380	35,064	29,466	+7.3	4,385	26,506	32,426	20,696	38,256
IV	42	28,851	28,512	+1.1	38,474	38,568	31,616	−11.1	5,013	28,232	35,000	21,590	41,642
V	88	33,543	32,928	−3.9	45,286	44,556	39,052	+0.7	5,554	35,303	42,801	27,944	50,160
VI	113	40,609	41,868	+10.2	55,616	56,640	44,925	−1.5	6,592	40,475	49,375	31,741	58,109
VII	45	46,995	50,508	+12.2	62,364	63,328	47,938	−11.7	9,775	41,340	54,536	28,388	67,488
VIII	55	53,860	55,560	−1.1	74,268	75,168	59,280	−6.1	7,068	54,509	64,051	45,144	73,416
IX	35	78,994	61,116	−0.9	82,016	82,680	73,943	+9.7	18,284	61,601	86,285	37,375	110,511
Average			39,864			53,929	40,884 Weighted average						

TABLE 12. Industry, Railroad or Utility—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES			MAXIMUM RATES		AVERAGE SALARY RATES						
		Average salary (3)	Median salary (4)	Change from 1985–1987 median as a percentage (5)	Average salary (6)	Median salary (7)	Mean average salary (8)	Change from 1985–1987 mean average as percentage (9)	Standard deviation (10)	Middle 50% Range		95% Range	
										Low (11)	High (12)	Low (13)	High (14)
I/II	63	25,022	24,500	[a]	35,263	34,900	27,571	[a]	4,697	24,401	30,741	18,177	36,965
III	73	28,405	27,593	[a]	41,799	42,601	32,861	[a]	6,144	28,714	37,008	20,573	45,149
IV	74	31,932	31,400	[a]	47,489	47,500	38,858	[a]	5,785	34,953	42,763	27,288	50,428
V	81	36,491	35,100	[a]	53,426	52,600	43,221	[a]	7,577	38,107	48,335	28,067	58,375
VI	96	42,940	41,500	[a]	58,451	59,180	50,289	[a]	7,509	45,220	55,358	35,271	65,307
VII	92	45,804	44,972	[a]	63,698	61,035	51,521	[a]	10,459	47,461	61,581	33,603	75,439
VIII	21	53,123	51,900	[a]	73,495	74,000	61,613	[a]	11,579	53,797	69,429	38,455	84,771
IX	18	62,922	62,000	[a]	102,326	96,918	76,481	[a]	21,901	61,698	91,264	32,679	120,283
Average			39,871			58,592	44,453 Weighted average						

[a]Not available.

TABLE 13. State Department or Agency—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES			MAXIMUM RATES		AVERAGE SALARY RATES						
		Average salary (3)	Median salary (4)	Change from 1985–1987 median as a percentage (5)	Average salary (6)	Median salary (7)	Mean average salary (8)	Change from 1985–1987 mean average as a percentage (9)	Standard deviation (10)	Middle 50% Range		95% Range	
										Low (11)	High (12)	Low (13)	High (14)
I/II	822	23,525	23,796	[a]	31,173	30,438	25,964	[a]	3,247	23,772	28,156	19,470	32,458
III	1,015	27,340	27,300	[a]	36,154	35,748	31,525	[a]	5,646	28,119	34,931	21,433	41,617
IV	943	30,229	31,080	[a]	41,081	41,969	35,105	[a]	5,311	31,520	38,690	24,483	45,727
V	1,057	33,359	32,300	[a]	44,994	45,220	40,121	[a]	6,701	35,598	44,644	26,719	53,523
VI	643	36,545	36,300	[a]	49,578	49,600	44,589	[a]	7,220	39,725	49,472	30,158	59,038
VII	294	40,954	39,500	[a]	53,788	56,400	49,154	[a]	9,005	43,076	55,232	31,144	67,164
VIII	80	42,290	42,378	[a]	55,538	56,088	50,500	[a]	9,565	44,044	56,956	31,370	69,630
IX	36	45,163	46,000	[a]	65,234	61,985	58,625	[a]	11,571	50,815	66,435	35,483	81,767
Average			34,832			47,181	36,427 Weighted average						

[a]Not available.

TABLE 14. Municipality or County—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES			MAXIMUM RATES		AVERAGE SALARY RATES						
		Average salary (3)	Median salary (4)	Change from 1985–1987 median as a percentage (5)	Average salary (6)	Median salary (7)	Mean average salary (8)	Change from 1985–1987 mean average as percentage (9)	Standard deviation (10)	Middle 50% Range		95% Range	
										Low (11)	High (12)	Low (13)	High (14)
I/II	1,257	25,178	25,200	[a]	34,034	33,834	29,145	[a]	4,125	26,361	31,929	20,895	37,395
III	686	28,649	29,335	[a]	37,108	37,700	33,402	[a]	7,453	28,371	38,433	18,496	48,308
IV	569	31,876	31,400	[a]	41,573	41,532	38,038	[a]	4,617	34,922	41,154	28,804	47,272
V	399	35,076	34,716	[a]	45,757	44,364	41,531	[a]	6,635	37,052	46,010	28,261	54,801
VI	184	30,055	37,115	[a]	49,510	48,391	44,553	[a]	8,171	39,038	50,068	28,211	60,895
VII	217	42,335	40,908	[a]	55,534	54,520	51,733	[a]	10,273	44,799	58,667	31,187	75,279
VIII	101	47,414	45,384	[a]	63,369	61,286	57,400	[a]	11,732	49,481	65,319	33,936	80,864
IX	43	56,085	54,720	[a]	74,388	72,256	69,641	[a]	13,687	60,402	78,880	42,267	97,015
Average			37,347			49,235	36,452 Weighted average						

[a]Not available

TABLE 15. Combined Grades—Annual Salaries, in Dollars

ASCE grade (1)	Number of individuals (2)	ENTRANCE RATES			MAXIMUM RATES		AVERAGE SALARY RATES						
		Average salary (3)	Median salary (4)	Change from 1985–1987 median as a percentage (5)	Average salary (6)	Median salary (7)	Mean average salary (8)	Change from 1985–1987 mean average as a percentage (9)	Standard deviation (10)	Middle 50% Range		95% Range	
										Low (11)	High (12)	Low (13)	High (14)
I/II	3,293	22,463	22,302	+11.5	29,518	29,500	25,738	+10.8	4,308	22,830	28,646	17,122	34,354
III	2,960	26,564	26,000	+8.3	34,594	34,300	30,352	+8.3	5,756	26,467	34,237	18,840	42,044
IV	2,574	31,193	30,500	+5.1	39,808	39,515	35,395	+6.1	5,757	31,509	39,281	23,881	46,909
V	2,769	35,886	35,000	+5.2	45,773	44,556	41,074	+6.7	6,908	36,411	45,737	27,258	54,890
VI	1,896	40,707	35,000	+2.6	51,595	52,000	46,505	+6.2	8,750	40,599	52,411	29,005	64,005
VII	1,489	46,157	40,000	+3.7	58,751	57,684	53,068	+5.9	11,580	45,252	60,885	29,908	76,228
VIII	641	51,318	45,000	+2.9	67,630	66,000	60,794	+7.6	15,525	50,315	71,273	29,744	91,844
IX	442	64,669	51,450	+13.2	81,913	79,000	75,092	+15.9	36,913	50,176	100,008	[a]	[a]
Average			38,781			50,319	38,520 Weighted average						

[a]Not meaningful.

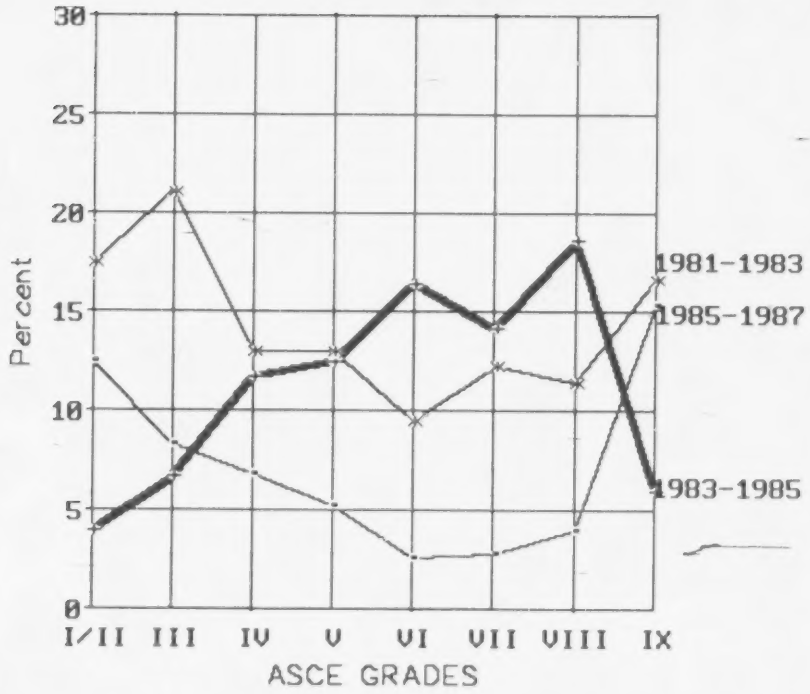

FIG. 2. Change in Entrance Salary Medians for Combined Employment Categories, 1981–1987

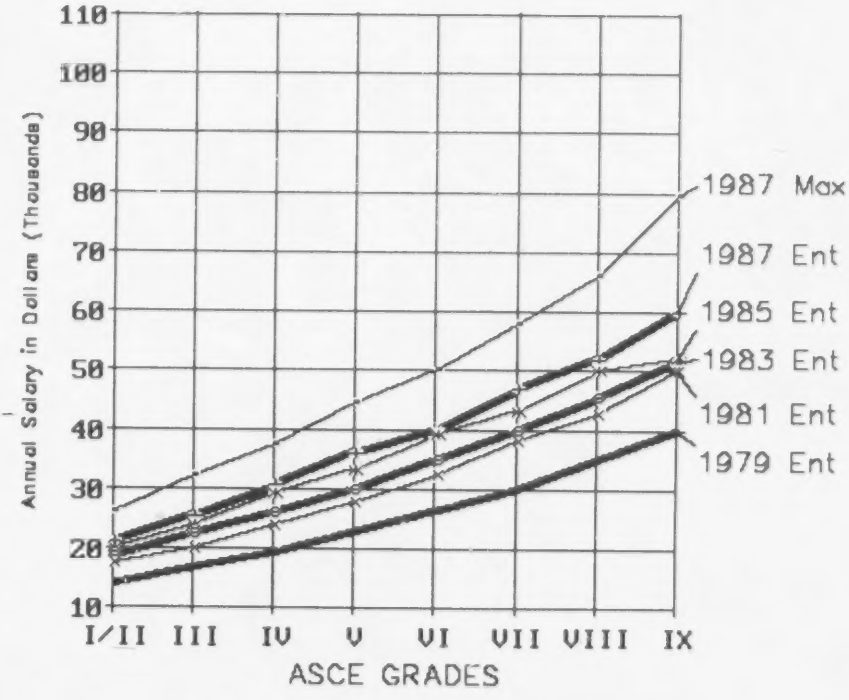

FIG. 3. Median Salary Rates: Consulting Firms

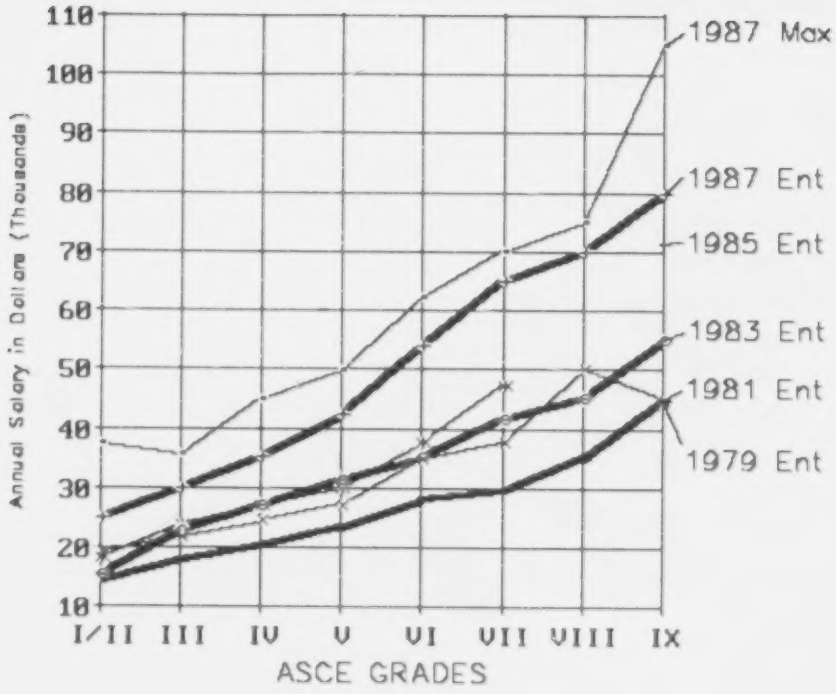

FIG. 4. Median Salary Rates: Construction Firms

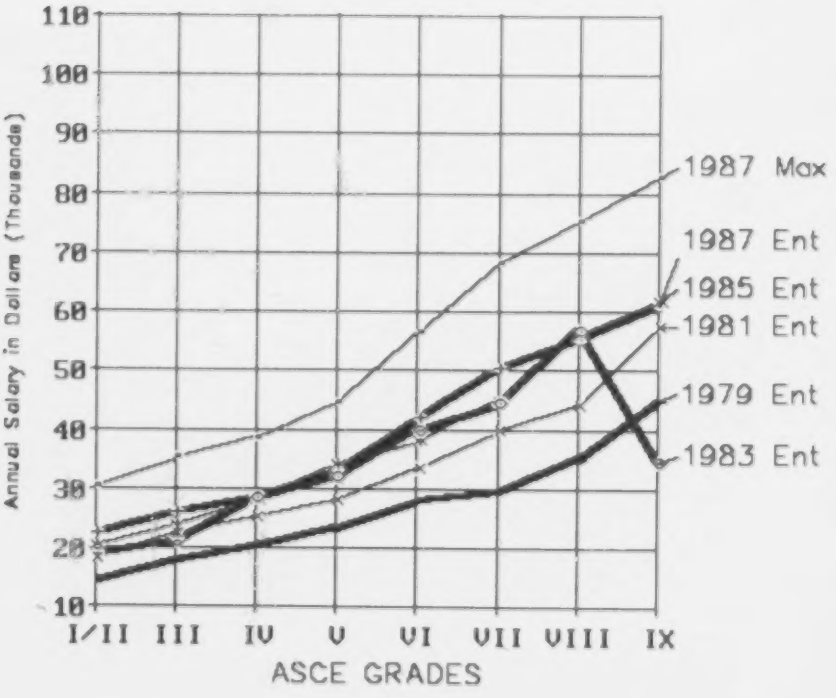

FIG. 5. Median Salary Rates: Design/Construct Firms

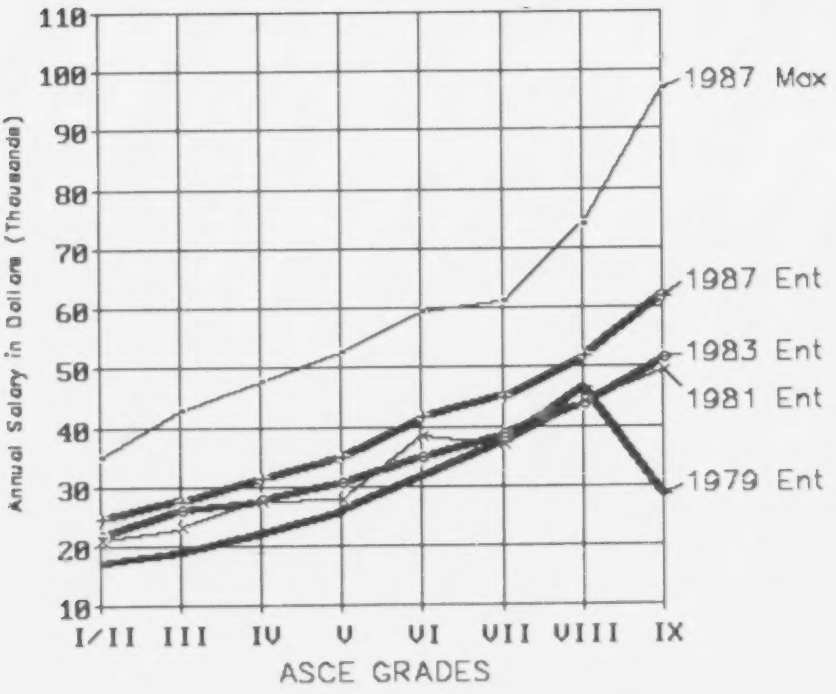

FIG. 6. Median Salary Rates: Industry, Railroad, or Utility

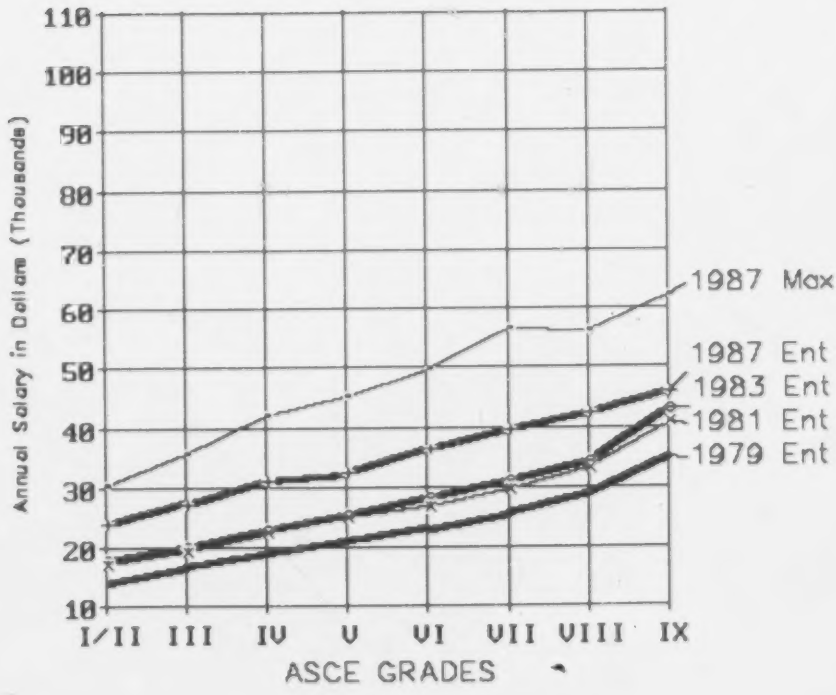

FIG. 7. State Department or Agency

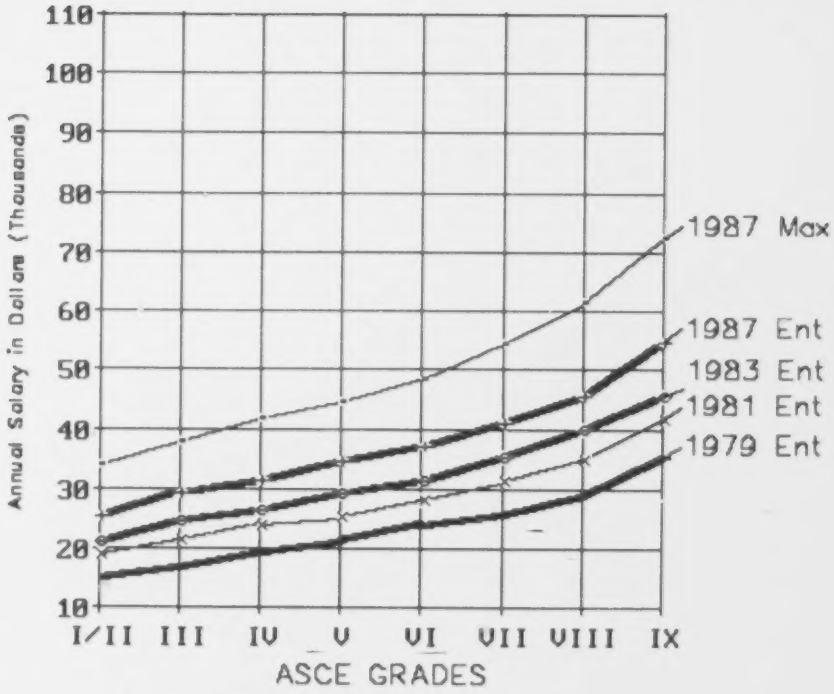

FIG. 8. Median Salary Rates: Municipality or County

and 95% ranges at the higher professional grade levels (i.e., ASCE grades VII–IX), where the likelihood of such a misinterpretation of grade levels is greater and a lesser number of individuals are surveyed.

Benefits

Table 5 shows that the overall benefit cost as a percentage of base payroll has remained relatively constant for the decade 1977–1987. Table 7 shows that the distribution of these benefits varies considerably. Social security, unemployment and workmen's compensation are taxes or insurance required by law, not optional benefits, but have historically been included on the list.

TABLE 16. Educational Background of Employees

Category (1)	B.S. degree (2)	Number of employers (3)	M.S. degree (4)	Number of employers (5)	Ph.D degree (6)	Number of employers (7)
Consulting firms	4,516	334	2,313	268	233	71
Construction firms	171	30	25	13	0	0
Design/Construct firms	340	29	266	18	22	4
Industry, railroad, or utility	384	30	98	24	3	3
State department or agency	2,981	23	277	21	8	6
Municipality or county	814	79	510	51	18	8

TABLE 17. Professional Registration

Category (1)	Number of P.E. (2)	Number of employers (3)	Number of EIT (4)	Number of employers (5)
Consulting firms	4,159	354	1,607	228
Construction firms	75	27	36	16
Design/construct firms	315	30	58	20
Industry, railroad, or utility	203	34	62	20
State department or agency	2,559	27	1,164	19
Municipality or county	1,082	83	978	44

Educational Background and Professional Registration

The data on educational background and professional registration in Tables 16 and 17 are provided for information only. No attempt has been made to correlate this information with salaries or any other category.

Regional Analysis

Overall median salaries are presented on a regional basis in Table 8. The regions are shown in Fig. 1. Although no definitive results can be determined based on the data collected, nationally the northeast region has historically had the lowest median salary in most grades. The data are much too limited to be conclusive.

Related Reference Sources

The Engineering Manpower Commission of the American Association of Engineering Societies publishes an annual report, *Professional Income of Engineers*, which correlates salary with the number of years since receipt of baccalaureate degree rather than with grade descriptions. NSPE conducts periodic salary surveys based on professional grade descriptions. The College Placement Council includes a survey of starting salary offers to bachelor degree candidates in civil engineering in its annual *CPC Salary Survey, a Study of Beginning Offers*. The U.S. Department of Labor's Bureau of Labor Statistics also reports annual salary data in its *National Survey(s) of Professional, Administrative, Technical, and Clerical Pay*. The Commission on Professionals in Science and Technology (formerly, the Scientific Manpower Commission) periodically publishes *Salaries of Scientists, Engineers, and Technicians*, collected from various sources. Several commercial firms also conduct salary research. Many of these surveys are conducted at regular intervals using similar formats each time so the data can be compared from period to period and trends determined.

ASCE's *Manual No. 55, Guide to Employment Conditions for Civil Engineers*, contains recommended ranges of total (salary plus benefit) compensation for the ASCE professional grades. In accordance with the recommendations in *Manual No. 55*, many ASCE sections and branches conduct local salary surveys to establish a current entrance salary base along with adjustment indices for their areas to use with the *Manual No. 55* compensation multiples. This listing is not intended to be all-inclusive, but does illustrate other sources of salary information to compare with or supplement this report.

Acknowledgments

The number of employer responses and the sampling of employees represented in this report have been developed from the recently implemented national ASCE membership data base and the efforts of local ASCE members in completing the salary survey questionnaire. Their contribution is vital to the success of the survey.

The Committee on Employment Conditions is grateful to all who supplied the data that made this report possible. The demand for copies of the survey shows its usefulness to employers and employees alike. COEC appreciates suggestions and comments for improvements in future surveys.

Members of the ASCE Committee on Employment Conditions include Chairmen Kevin K. Egan (1987), Michael Riddiford (1988), J. Edward Doyle (1989), Harold R. Clemmer, Albert A. Fazio, William J. Ghormley, Joseph E. Hardee, Harold R. Murray, Jack R. Niemi, Rodney P. Ploude, Rajan I. Sheth, Norman G. Weintraub, Barry F. Winkler, Professional Practice Division Executive Committee (PRODEX) contact members Will M. Heiser (1987) and Joyce A. Padgett, Jr. (1988–89). Corresponding members are John R. Ellis, Oscar R. (Bob) George, David W. Klotz, and Dennis R. Martenson. Staff Contact is ASCE Manager of Professional Services Carl M. Hirsch.

APPENDIX I. QUESTIONNAIRE

1987 ASCE SURVEY OF CIVIL ENGINEERING SALARIES

Name of Organization _____

Address _____

City _____ State _____ Zip _____

General nature of business _____

Name and title of respondent _____

Is the above information different from the mailing label? Yes ____ No ____

Have you received more than one copy of this survey? Yes ____ No ____
(If yes, please attach both / all mailing labels.)

INSTRUCTIONS

1. Please refer to the ASCE Professional Grade Descriptions* (copy enclosed) and assign each engineering position in your organization to the appropriate ASCE Grade. The relationship between U.S. Civil Service Grades and ASCE Grades is shown in Table I of the enclosure. If a particular GRADE DOES NOT APPLY to your organization ENTER "X" under annual salary and number of employees. If at this time, there are NO EMPLOYEES IN A PARTICULAR GRADE for which a SALARY RANGE is PROVIDED enter "0" under number of employees.
2. Report data in terms of ANNUAL BASE SALARY only. Monthly or weekly rates should be converted to annual salary. (Do not include items such as bonuses, profit sharing, etc.)
3. Round salary and incentive compensation to NEAREST HUNDRED DOLLARS. If no incentive compensation enter "0".

QUESTIONNAIRE — PART I, SALARY DATA

1. Please indicate which of the major employment categories listed below best applies to your organization by putting the appropriate number in the box to the right. ☐
   1. Consulting
   2. Construction
   3. Design/Construction
   4. Industry, Railroad or Utility
   5. State Department or Agency
   6. Municipality or County
2. Please enter the appropriate State Code for your office location from the back of the ASCE Professional Grade Descriptions enclosed. ☐
   Geographic distribution is important to the survey. If reporting for more than one location please fill out a form or copy thereof for each.
3.

ASCE Professional GRADE*	ANNUAL BASE SALARY ($) (not monthly or weekly rate) RANGE			Number of EMPLOYEES IN GRADE (If none, enter 0)	$ VALUE OF INCENTIVE COMPENSATION IN 1987 (Bonuses and or Profit sharing)
	ENTRANCE	AVERAGE	MAXIMUM		
III	$	$	$	$	$
IV	$	$	$	$	$
V	$	$	$	$	$
VI	$	$	$	$	$
VII	$	$	$	$	$
VIII	$	$	$	$	$
IX	$	$	$	$	$

(1) AVERAGE salary of all employees in the indicated ASCE GRADE

PART II. SALARY RELATED BENEFITS

Over the years numerous non-salary benefits have become a significant complement to annual base salary in making up total compensation. Therefore, it is essential to consider both when making a comparison or evaluation. For this reason, we ask that you INDICATE THE APPROXIMATE PERCENT of your ANNUAL BASE PAYROLL[2] represented by each of the benefit items listed below.

It is not necessary to provide detailed descriptions or pinpoint accuracy. We just need a good general picture in terms of approximate percentages that can be easily tabulated. For "Retirement", "Insurance" and other similar benefits, INDICATE ONLY THE ANNUAL CONTRIBUTION MADE BY THE ORGANIZATION for the benefit of the employee. If benefit is given, but percentage is not available, enter "N/A". If benefit is not given, enter "0".

	PERCENTAGE[1] OF ANNUAL BASE PAYROLL	COMMENTS
1. Vacation	_____%	_____
2. Holidays	_____%	_____
3. Sick Leave	_____%	_____
4. Military Leave and Jury Duty	_____%	_____
5. Incentive Compensation (1987)	_____%	_____
6. Retirement Income and Deferred Profit Sharing (ESOP, SRP, TRASOP, etc.)	_____%	_____
7. Social Security, Unemployment and Workmen's Compensation Taxes	_____%	_____
8. Professional Dues, Licenses and Meetings	_____%	_____
9. Insurance — medical	_____%	_____
10. Insurance — life	_____%	_____
11. Education	_____%	_____
12. Separation Allowance	_____%	_____
13. Other — including vehicle, parking, etc.	_____%	_____

(2) Annual Base Payroll is defined as basic payroll (combined salaries) for 52 weeks, and does not include overtime or incentive compensation (bonuses and/or profit sharing).
(3) Use decimals for fractions of a percent — ie. 2.50%.

GENERAL INFORMATION

The following questions refer to MANUAL 55, ASCE GUIDE TO EMPLOYMENT CONDITIONS FOR CIVIL ENGINEERS. This publication has been widely distributed by the Society in an attempt to inform its members, employers and employees alike, of reasonably acceptable personnel management practices and to provide a common basis for communication, cooperation and mutual understanding. We are interested in learning your reaction to this publication.

As with other portions of the questionnaire, individual responses to the following questions WILL BE KEPT CONFIDENTIAL.

	Yes	No
1. Are you familiar with ASCE Manual 55?	☐	☐
If yes, how do employment conditions in your organization compare with recommendations in each section of Manual 55? (Answer for each section) 1. Better 2. Similar 3. Not as Good 4. No opinion		
Section 1 — Professional Employment	☐	
Section 3 — Recommended Salary Ranges	☐	
Section 4 — Recommended Benefits	☐	

	Yes	No
2. Have you come to an understanding with your employees on their Professional Grade Classification?	☐	☐
Do you use the ASCE Professional Grade Descriptions?	☐	☐

3. How many engineers in your employ have as their highest degree a BS _____? an MS _____? a Ph.D. _____?

4. How many are registered Professional Engineers _____? EIT's _____?

5. Have you used previous ASCE Salary Survey Reports? Yes _____ No _____

6. If so, do you think the data is representative of the profession? Yes _____ No _____

7. Was this questionnaire easy to understand? Yes _____ No _____

8. Recommendations for changes in future salary survey questionnaires:

_____

_____

THANK YOU FOR YOUR COOPERATION
PLEASE BE SURE TO RETURN THIS QUESTIONNAIRE BEFORE NOVEMBER 2, 1987
in the self-addressed envelope provided

ASCE will provide a copy of this Salary Survey Report to those who respond to this questionnaire. If you wish to order additional reprints of the Salary Survey Report, just fill out the order form below, enclose check for the appropriate amount and return with questionnaire to Carl M. Hirsch, c/o ASCE.

PLEASE FORWARD TO:

Name _____ Title _____ ASCE ID.# _____

Firm or Agency _____

Address _____ City _____ State _____ Zip _____

_____ copies of ASCE Salary Survey Report (ASCE member price $2.00, non-member price $4.00 per copy) _____

Total _____

Appendix II. ASCE Professional Grade Descriptions

The purpose of these grade descriptions is to enable employers and employees to ascertain an individual's professional grade. The system can also be a helpful tool for encouraging engineers to improve their ability so as to qualify for higher grades and to facilitate agreement between the employer and the employee regarding each engineer's level of responsibility.

These grade descriptions are compatible with those of the U.S. Department of Labor, Bureau of Labor Statistics (BLS) and of the National Society of Professional Engineers (NSPE). It must be stressed that the grade descriptions are intended to cover the requirements of a wide range of typical engineering organizations but cannot possibly fit all. Many employers may not have the full range of positions listed. Table #1 (on the back page) indicates Federal G.S. equivalents with ASCE grades.

Descriptions should be considered as typical characteristics of a particular grade, rather than as desirable or minimum requirements. For example, it is expected that in many areas of practice, such as research and development, individuals filling middle or higher level positions would routinely have graduate degrees, though this is not indicated. All descriptive matter should be considered when a position is being evaluated. Literal conformance with every item in the descriptions is not necessary when there is a preponderance of evidence that the person measures up to the intended level of competence and responsibility.

Suitable professional recognition and salary scales should be provided for the engineer who selects the technical path for advancement so that he may achieve the same or greater professional and economic status as the engineer who advances along the management path. The grade descriptions include language applicable to both.

Many positions may require an advanced degree. There also may be cases where individuals holding engineering positions have degrees in certain scientific or other closely related fields.

ASCE PROFESSIONAL

	Engineer I/II	Engineer III	Engineer IV	Engineer V
General Characteristics	This is the entry level for professional work. Performs assignments designed to develop professional work knowledge and abilities requiring application of standard techniques, procedures, and criteria in carrying out a sequence of related engineering tasks. Limited exercise of judgment is required on details of work and in making preliminary selections and adaptations of engineering alternatives.	Independently evaluates, selects, and applies standard engineering techniques, procedures, and criteria, using judgment in making minor adaptations and modifications. Assignments have clear and specified objectives and require the investigation of a limited number of variables. Performance at this level requires developmental experience in a professional position or equivalent graduate level education.	As a fully competent engineer in all conventional aspects of the subject matter of the functional area of the assignments, plans and conducts work requiring judgment in the independent evaluation, selection, and substantial adaptation and modification of standard techniques, procedures, and criteria. Devises new approaches to problems encountered. Requires sufficient professional experience to assure competence as a fully trained worker, or, for positions primarily of a research nature, completion of all requirements for a doctoral degree may be substituted for experience.	Applies intensive and diversified knowledge of engineering principles and practices in broad areas of assignments and related fields. Makes decisions independently on engineering problems and methods, and represents the organization in conferences to resolve important questions and to plan and coordinate work. Requires the use of advanced techniques and the modification and extension of theories, precepts and practices of his field and related sciences and disciplines. The knowledge and expertise required for this level of work usually result from progressive experience.
Direction Received	Supervisor screens assignments for unusual or difficult problems and selects techniques and procedures to be applied on nonroutine work. Receives close supervision on new aspects of assignments.	Receives instructions on specific assignment objectives, complex features, and possible solutions. Assistance is furnished on unusual problems and work is reviewed for application of sound professional judgment.	Independently performs most assignments with instructions as to the general results expected. Receives technical guidance on unusual or complex problems and supervisory approval on proposed plans for projects.	Supervision and guidance relate largely to overall objectives, critical issues, new concepts, and policy matters. Consults with supervisor concerning unusual problems and developments.
Typical Duties & Responsibilities	Using prescribed methods, performs specific and limited portions of a broader assignment of an experienced engineer. Applies standard practices and techniques in specific situations, adjusts and correlates data, records results, observations, and findings, and follows organizational practices through a series of related detailed steps or processes.	Performs work which involves conventional types of plant investigations, surveys, structures, or equipment with relatively few complex features for which there are precedents. Assignments usually include one or more of the following: Equipment design and development; test of materials; preparation of specifications; process study research investigations; report preparation; and other activities of limited scope requiring knowledge of principles and techniques commonly employed in the specific narrow area of assignments.	Plans, schedules, conducts, or coordinates detailed phases of the engineering work in part of a major project or in a total project of moderate scope. Performs work which involves conventional engineering practice but may include a variety of complex features such as conflicting design requirements; unsuitability of conventional materials; and difficult coordination requirements. Work requires a broad knowledge of precedents in the specialty area and a good knowledge of principles and practices of related specialties.	One or more of the following: (1) In a supervisory capacity, plans, develops, coordinates, and directs a large and important engineering project or a number of small projects with many complex features. A substantial portion of the work supervised is comparable to that described for engineer IV. (2) As individual researcher or worker, carries out complex or novel assignments requiring the development of new or improved techniques and procedures. Work is expected to result in the development of new or improved techniques and procedures. Work is expected to result in the development of new or refined equipment, materials, processes, products, and/or scientific methods. (3) As staff specialist, develops and evaluates plans and criteria for a variety of projects and activities to be carried out by others. Assesses the feasibility and soundness of proposed engineering evaluation tests, products, or equipment when necessary data are insufficient or confirmation by testing is advisable. Usually performs as a staff advisor and consultant as to a technical specialty a type of facility or equipment, or a program function.
Responsibility for Direction of Others	May be assisted by a few aides or technicians.	May supervise or coordinate the work of draftsmen, technicians, and others who assist in specific assignments.	May supervise or coordinate the work of engineers, draftsmen, technicians, and others who assist in specific assignments.	Supervises, coordinates, and reviews the work of a small staff of engineers and technicians; estimates manpower needs and schedules and assigns work to meet completion date. Or, as individual researcher or staff specialist may be assisted on projects by other engineers or technicians.
Typical Position Titles	Junior Engineer; Associate Detail Engineer; Engineer-in-Training; Asst. Research Engineer; Construction Inspector.	Engineer or Assistant Engineer; Project; Plant; Office Design; Process; Research; Inspector; Engineering Instructor.	Engineer or Assistant Engineer; Resident; Project; Plant; Office; Design; Process; Research; Chief Inspector; Assistant Professor.	Senior or Principal Engineer; Resident; Project; Office; Design; Process; Research; Asst. Division Engineer; Associate Professor; Project Leader.
Education	Bachelor's Degree in engineering from an ABET accredited curriculum or equivalent, plus appropriate continuing education.			
Registration Status	Certified Engineer-in-Training.		Registered Professional Engineer.	
Typical Professional Attainments	Member of Professional and Technical Societies (Associate Grade or Equivalent).		Member of Professional Society (Member Grade). Member of Technical Society (Associate Grade or Equivalent).	Member of Technical Society (Member Grade). Publishes engineering papers, articles, textbooks, or

GRADE DESCRIPTIONS

Engineer VI	Engineer VII	Engineer VIII	Engineer IX
Has full technical responsibility for interpreting, justifying, executing, and coordinating assigned tasks. Plans and develops engineering projects, commonly with groups or continuous problems which have an important effect on major organization programs. Has minimal supervision of subordinates, selection of scope and selection of problems for investigation, and development of novel concepts and approaches. Maintains relations with individuals and units within or outside his organization with responsibility for acting independently on technical matters pertaining to his field. Work at this level usually requires extensive progressive experience.	Makes decisions and recommendations that are recognized as authoritative and have an important impact on extensive engineering activities. Initiates and maintains extensive contacts with key engineers and officials of other organizations and companies, requiring skill in persuasion and negotiation of critical issues. At this level individuals will have demonstrated creativity, foresight, and mature engineering judgment in anticipating and solving unprecedented engineering problems. Determining program objectives and requirements, organizing programs and projects, and developing standards and guides for diverse engineering activities.	Makes decisions and recommendations that are recognized as authoritative and have wide-reaching impact on extensive engineering and related activities of the company. Negotiates critical and controversial issues with top level engineers and officers of other organizations and companies. Individuals at this level demonstrate a high degree of creativity, foresight, and mature judgment in planning, organizing, and guiding extensive engineering programs and activities of outstanding novelty and importance.	An engineer in this level is either: (1) in charge of programs so extensive and complex as to require staff and resources of sizeable magnitude (e.g., research and development a department of government responsible for extensive engineering programs, or the major component of an organization responsible for the engineering required to meet the objectives of the organization); or (2) is an individual researcher or consultant who is recognized as a national and/or international authority and leader in an area of engineering or scientific interest and investigation.
Supervision received is essentially administrative with assignments given in terms of broad general objectives and limits.	Supervision received is essentially administrative with assignments given in terms of broad general objectives and limits.	Receives general administrative direction.	
One or more of the following: (1) In a supervisory capacity (e.g., plans, develops, coordinates, and directs a number of large and important projects or a project of major scope and importance; or (2) is responsible for the entire engineering program of an organization when the program is of limited complexity and scope. The extent of his responsibilities generally require a few (3 to 5) subordinate supervisors or team leaders each of whom is in a position comparable to level V. (2) As individual researcher or worker conceives, plans, and conducts research or problem areas of considerable scope and complexity. The problems must be approached through a series of complex and closely interrelated studies, are difficult to define, require unconventional or novel approaches, and require sophisticated research techniques. Available guides and precedents contain critical gaps, are only partially related to the problem, or may be largely lacking, due to the novel character of the project. At this level, the individual researcher generally will have contributed inventions, new designs, or technical issues which are of material significance in the solution of important problems. (3) As a staff specialist serves as the technical specialist for the organization, division or company in the application of advanced theories, concepts, principles, and processes for an assigned area of responsibility (i.e., subject matter, function, type of facility or equipment, or product). Keeps abreast of new scientific methods and developments effectively, his organization for the purpose of recommending changes in emphasis of programs or new programs warranted by such developments.	One or both of the following: (1) In a supervisory capacity is responsible for (a) an important segment of the engineering program of a organization with extensive and diversified engineering requirements; or (b) the entire engineering program of an organization either is more limited in scope. The overall engineering program contains critical problems the solution of which requires major technological advances and opens the way for extensive related development. The extent of his responsibilities generally requires several subordinate or semi-subordinate supervisors or teams. Recommends facilities, personnel, and funds required to carry out programs which are directly related with and directed toward fulfillment of overall organization objectives. (2) As individual researcher and consultant is a recognized leader and authority in his organization in a broad area of specialization or in a narrow but intensively specialized field. Selects research problems to further the organization's objectives. Conceives and plans investigations of broad areas of considerable novelty and importance for which engineering precedents are lacking or are only critical to the overall engineering program. Is consulted extensively by associates and others with a high degree of reliance placed on his scientific interpretations and advice. Typically will have contributed inventions, new designs, or techniques which are regarded as major advances in the field.	One or both of the following: (1) In a supervisory capacity is responsible for (a) an important segment of a very extensive and diversified highly engineering program; or (b) the entire engineering program when the program is of moderate scope. The programs are of such complexity that they are of critical importance to overall objectives. Include problems of extraordinary difficulty that often have required solution and control of several segments requiring subordinate supervisors. Is responsible for deciding the kind and extent of engineering and related programs needed for accomplishing the objectives of the organization, for choosing the scientific approaches for planning and organizing facilities and programs, and for interpreting results. (2) As individual researcher and consultant formulates and guides the attack on problems of exceptional difficulty and marked importance to the organization or industry. Problems are characterized by their lack of scientific precedents and source material or lack of success of prior research and analysis so that their solution would represent an advance of great significance and importance. Performs advisory and consulting work for the organization as a recognized authority for broad program areas or in an intensely specialized area of considerable novelty and importance.	
Plans, organizes, and supervises the work of a staff of engineers and technicians. Evaluates progress of the staff and results obtained, and recommends major changes to achieve overall objectives. Or as individual research or staff specialist may be assisted on individual projects by other engineers or technicians.	Directs several subordinate supervisors or team leaders, some of whom are in positions comparable to Engineer VI, or as individual researcher and consultant may be assisted on individual projects by other engineers and technicians.	Supervises several subordinate supervisors or team leaders, some of whose positions are comparable to Engineer VII, or individual researchers some of whose positions are comparable to Engineer VII and sometimes Engineer VIII. As an individual researcher and consultant may be assisted on individual projects by other engineers or technicians.	
Senior or Principal Engineer, Division or District Engineer, Production Engineer, Assistant Division District or Chief Engineer, Consultant, Professor, City or County Engineer.	Principal Engineer, Division or District Engineer, Department Manager, Director or Assistant Director of Research, Consultant, Professor, Distinguished Professor or Department Head, Assistant Chief or Chief Engineer, City or County Engineer.	Chief Engineer, Bureau Engineer, Director of Research, Department Head or Dean, County Engineer, City Engineer, Director of Public Works, Senior Fellow, Senior Staff, Senior Advisor, Senior Consultant, Engineering Manager.	Director of Engineering, General Manager, Vice President, President, Partner, Dean, Director of Public Works.
makes presentations, gives lectures, provides training, etc.			

TABLE #1
ASCE GRADES / FEDERAL G.S. EQUIVALENTS

ASCE GRADES	FEDERAL G.S.
I/II	5-7
III	9
IV	11
V	12
VI	13
VII	14
VIII	15
IX	16 and above

State Codes for "Office Location"

(see page 1 of questionnaire)

1 Alabama
2 Alaska
3 Arizona
4 Arkansas
5 California
6 Colorado
7 Connecticut
8 Delaware
9 District of Columbia
10 Florida
11 Georgia
12 Hawaii
13 Idaho
14 Illinois
15 Indiana
16 Iowa
17 Kansas
18 Kentucky
19 Louisiana
20 Maine
21 Maryland
22 Massachusetts
23 Michigan
24 Minnesota
25 Mississippi
26 Missouri
27 Montana
28 Nebraska
29 Nevada
30 New Hampshire
31 New Jersey
32 New Mexico
33 New York
34 North Carolina
35 North Dakota
36 Ohio
37 Oklahoma
38 Oregon
39 Pennsylvania
40 Rhode Island
41 South Carolina
42 South Dakota
43 Tennessee
44 Texas
45 Utah
46 Vermont
47 Virginia
48 Washington
49 West Virginia
50 Wisconsin
51 Wyoming
52 Canal Zone
53 Guam
54 Puerto Rico
55 Virgin Islands

98 Outside the U.S. *with* APO
99 Outside the U.S. *without* APO

APPENDIX III. REFERENCES

ASCE 1983 Salary Survey. (1983). ASCE, New York, N.Y.
"ASCE 1985 Salary Survey." (1986). *J. Profl. Issues Engrg.*, ASCE, 112(4), 307–326.